What is claimed is:

1. A catheter tip retention device comprising:

a catheter tip having an outer circumferential wall and an opening through the outer circumferential wall for receiving an end of a catheter; and

a retaining ring constructed of a shape memory material set to a first configuration having a first diameter, wherein the retaining ring is configured to be expanded to a second configuration having a second diameter greater than the first diameter so that the ring has a circumference greater than the outer circumferential wall of the catheter tip, and so that the ring may be positioned over the outer circumferential wall of the catheter tip; and wherein the retaining ring is configured to return towards its first diameter thereby coupling the end of the catheter to the catheter tip.

2. The catheter tip retention device of claim 1 wherein the ring comprises an alloy of nickel and titanium.

3. The catheter tip retention device of claim 1 wherein the retaining ring is in an austenitic phase in the first configuration.

4. The catheter tip retention device of claim 1 wherein the retaining ring is in a temperature induced martensitic phase in the second configuration.

5. The catheter tip retention device of claim 1 wherein the retaining ring is in a stress induced martensitic phase in the second configuration.

6. The catheter tip retention device of claim 3 wherein the shape memory alloy has a phase transformation temperature of below about 68 degrees Fahrenheit.

7. The catheter tip retention device of claim 1 further comprising a catheter, wherein the catheter has an end.

8. The catheter tip retention device of claim 7 wherein the end of the catheter comprises an inner member of a catheter.

9. The catheter tip retention device of claim 7 wherein the ring causes an interference fit between the catheter tip and the end of the catheter.

10. The catheter tip retention device of claim 1 wherein the catheter tip comprises a slot in the outer circumference of the catheter tip configured to receive the ring.

11. A catheter tip retention device comprising:

a catheter tip means for tracking a catheter through a body lumen, the catheter tip means having an outer circumferential wall means and an receiving means through the outer circumferential wall means for receiving an end of a catheter means; and

a retaining means for coupling the catheter tip means to an end of a catheter means, wherein the retaining means comprises a superelastic means for causing the retaining means to return to a first set configuration having a first diameter from a second expanded configuration having second diameter greater than the first diameter, to thereby couple the catheter tip means to the end of the catheter means.

12. The catheter tip retention device of claim 11 wherein the shape memory means is temperature set to the first configuration.

13. The catheter tip retention device of claim 10 wherein the shape memory means comprises a spring means for causing the retaining means to return to the first set configuration.

14. A method of manufacturing a catheter comprising the steps of:

providing:

a catheter having an end;

a catheter tip having an outer circumferential wall and an opening through the outer circumferential wall for receiving the end of a catheter; and

a retaining ring constructed of a shape memory material set to first configuration having a first diameter;

inserting the end of the catheter into the opening of the catheter tip;

expanding the retaining ring to a second configuration having second diameter greater than the first diameter so that the ring has a circumference greater than the outer circumferential wall of the catheter tip;

positioning the ring over the outer circumferential wall of the catheter tip; and

causing the retaining ring to return towards its first diameter thereby coupling the end of the catheter to the catheter tip.

15. The method of claim 14 wherein the shape memory alloy has a phase transformation temperature;

wherein the step of expanding the retaining ring comprises: cooling the ring to a temperature at or below the phase transformation temperature ; and

wherein the step of causing the retaining ring to return towards its first diameter comprises: warming the ring to a temperature at or greater than the phase transformation temperature.

16. The method of claim 14 wherein the step of expanding the ring to the second configuration comprises stressing the shape memory material to a stress induced martensitic phase; and wherein the step of causing the retaining ring to return towards its first diameter releasing the stress on the shape memory material whereby the shape memory material returns to an austenitic phase.